

Wilbur D. May Arboretum & Botanical Garden

WILBUR'S EXPLORER GUIDE



ACTIVITIES FOR FOURTH GRADE

Table of Contents

<i>A Note from a Horticulturist</i>	3
<i>Map of Wilbur D. May Arboretum</i>	4
<i>Who was Wilbur D. May?</i>	5
<i>What is an Arboretum?</i>	6
<i>Suggestions for Families</i>	7
<i>Suggestions for Teachers</i>	8
<i>Fourth Grade</i>	9
<i>Adaptation Adventure</i>	10-12
<i>A Story about Flooding</i>	13-15
<i>Rain Shadows</i>	16-18
<i>Next Generation Science Standards</i>	19
<i>Acknowledgements</i>	20

A Note from a Horticulturist

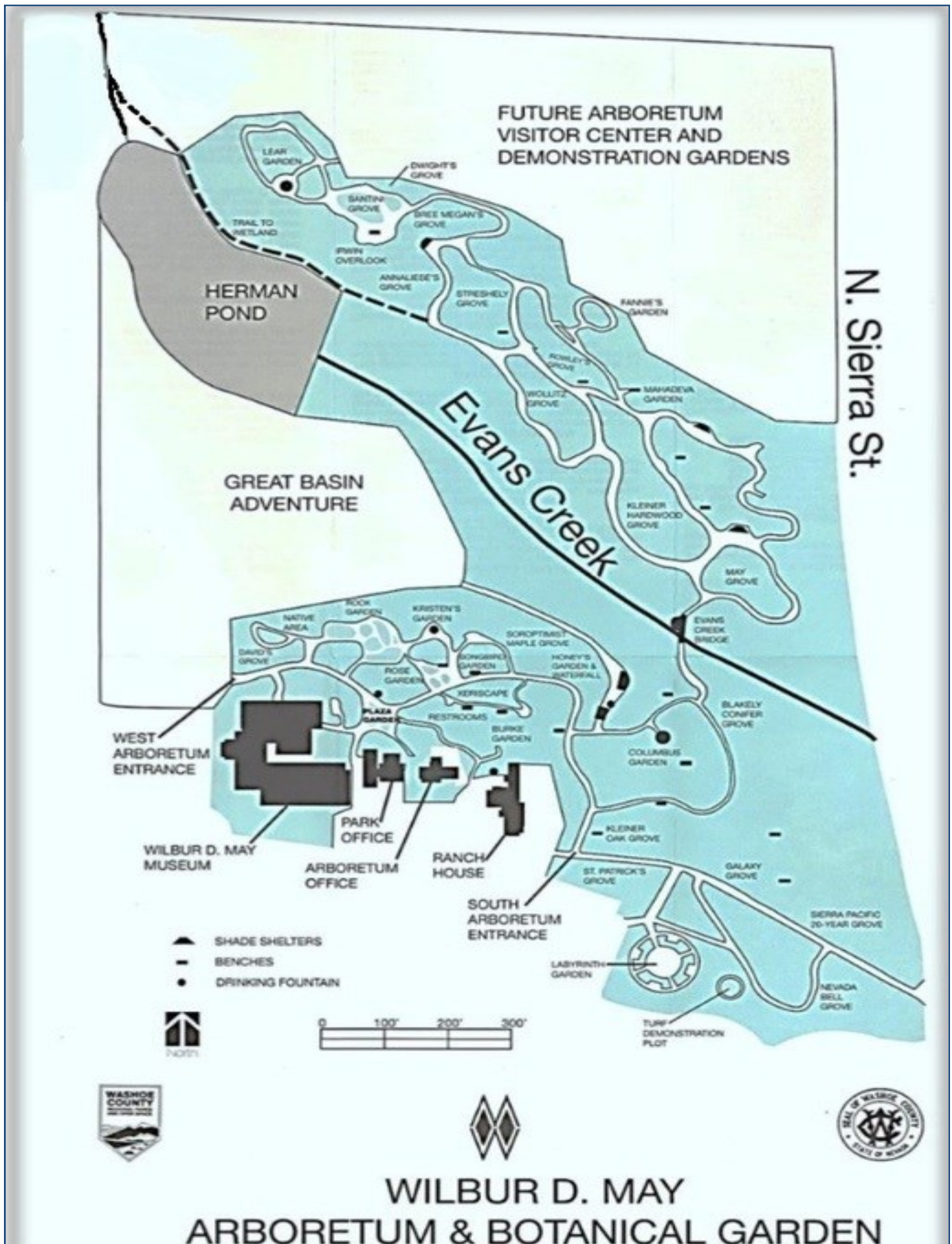
“The May Arboretum like many public gardens are an expression of the local cultural heritage and social norm. The May Arboretum is multifaceted and serves our community of all ages throughout the season. It is an outdoor environment to teach children and adults about our natural world. It is also a place for solace, reflection and peace. It provides the beleaguered urbanite an environment to surrender their busy schedule under an oak or willow tree in the wetlands or any garden or grove. Walking through the gardens rejuvenates the soul and offers a time and place to have a transcendent moment, unlike a busy parks or trails. The May Arboretum provides all of this and many more intangibles, and what is so unique about it, it is easily accessible.”

Working here at the Arboretum is a gift and an honor because not every town has one. It is a pleasure working here because the gardens and groves were built with donated funds and by passionate people. I enjoy coming to work to experience and feel the dynamics of the seasons. I appreciate the diversity of my horticulture vocation; from the scientific aspect of keeping accurate botanical plants records and maps, learning about new plant varieties and botanical knowledge, managing a greenhouse, writing horticulture articles, planting and designing new gardens, educating and teaching the public, meeting with donors and most of all provide direction to this distinctive facility. I enjoy working with volunteers and the flexibility to escape into gardens for a walk or work with staff. It is the most rewarding job I have had in my 33 year horticulture career. But what is most gratifying are the frequent public comments I receive, e.g., “this is such a beautiful place, what a treasure and jewel it is”.

-Bill Carlos, Horticulturist

Wilbur D. May Arboretum & Botanical Garden

2017



Who was Wilbur D. May?

Wilbur D. May was an explorer! He loved to travel to new places and learn about the plants, animals, and people. Wilbur visited far off regions like Africa, South America, and Asia. He often met with the local people and traded for artifacts.



Wilbur made over 40 trips around the world! He learned how to fly, became an artist, and even wrote a song about pizza! In 1936, Wilbur moved to Reno, Nevada where he bred horses and cattle. Wilbur loved education and sharing with the community. Toward the end of his life, his family worked to create a museum to display Wilbur's findings. They began working with Ed Kleiner to create an Arboretum & Botanical Garden too. In 1986 the Wilbur D. May Arboretum & Botanical Garden opened to the public.



What is an Arboretum?

Like many people you may be wondering, what is an Arboretum? Similar to a Botanical Garden, an Arboretum is a collection of plants.

However, Arboretums are different because the collection is trees.



Think of an Arboretum as a tree zoo!



Arboretums are created for scientific research, education, and a place to explore.

Who takes Care of the Wilbur D. May Arboretum?

The Wilbur D. May Arboretum is cared for by dedicated volunteers, maintenance workers, and horticulturists. A horticulturist is someone who takes care of plants and makes sure they grow. This team works very hard together to make sure the trees and plants are doing their best!

Time to put on your backpack!

Now that you know about Wilbur D. May and what an Arboretum is, grab your backpack and explore! The rest of this guide includes activities for grades kindergarten through fifth. Find your grade, challenge yourself, and discover the adventure that is awaiting you at the Wilbur D. May Arboretum and Botanical Garden!



Suggestions for Families

There are lots of different options in the backpack for exploration.

- You can create your own Arboretum adventure by using the bird guide, tree guide, magnifying glass, and tape measure while exploring the gardens.
- Use the tape measure to measure tree trunks, and compare to your height!
- Follow the activities in this guide that are appropriate for your child's age.
- Reading the Introduction to each activity will give background information and set you and your explorer up for success!
- All the activities can be modified to be more difficult or less difficult.
- Take your time when walking through the Arboretum and keep low voices to increase your chances of seeing wildlife.
- If you have different aged children, suggest the older children help the younger ones with their activities.
- Ask open ended questions such as:

What do you see?

What do you feel?

What does it remind you of?

What do you wonder?

Suggestions for Teachers

Wilbur's Explorer Pack is an opportunity to immerse students in the outdoor classroom under your direction. Each pack has the supplies needed for an enriching field trip such as a bird guide, tree guide, measuring tape, magnifying glass, along with the curriculum in this guide. All of the following activities have been designed around Next Generation Science Standards . The standards corresponding to each activity can be found on page 19. However, you don't have to follow this guide.

When deciding on outdoor classroom activities, be inspired. Give guidelines, and follow the curiosity and wonder of students. Asking lots of open ended questions can encourage discussion and exploration. With diverse gardens, ecosystems, and accessibility, the Wilbur D. May Arboretum is a beacon for education of all ages.



FOURTH GRADE

**-ADAPTATION
ADVENTURE**

**-ANIMAL
COMMUNICATION**

**- RAIN SHADOWS: IS
THE GRASS ALWAYS
GREENER?**



Adaptation Adventure

Suggested Gardens: Rock Garden, Native Area, Songbird Garden, Evans Creek Bridge.

Vocabulary: Adaptations.

Introduction: Have you ever wondered why there are so many plants and animals? Why do butterflies come in a variety of shapes and colors? Why are there so many types of beetles? Plants and animals are so diverse in order to survive. Each plant and animal is adapted to their certain environment in order to survive. Let's find and discuss a few examples.

Cacti are plants that have been adapted to the desert climate for many years. Cacti are succulent and able to hold large amounts of water. Their spines, which are modified leaves, protect the cactus from predators. Willow trees are the complete opposite growing in and around water. Willows have a large rooting system allowing them to withstand floods and reach water during dry seasons.

Hummingbirds vary in color. Males are brightly colored to attract females, and females blend into the environment to hide from predators and protect their young. Cottontails are small, and their back legs allow them to move quickly away from predators. These are just a few ways animals have adapted to their environment in order to survive. Now let's find some more adaptations of plants and animals in the Arboretum.

Activity: Adaptation Adventure

1. Visit the Native Area.
2. Find the cactus and discuss why the cactus has thorns.
3. Turn to the "Adaptation Adventure" page.
4. Explore the gardens and see if you can find adaptations in the Arboretum.

Adaptation Adventure

Thinking Questions:

1. What do plants need to survive?
2. What is the weather like in Reno?
3. How does weather affect plants?
4. What do animals need to survive?
5. How do adaptations help animals and plants?

Bees: focus on bee's coloring and how they defend themselves from others.

Sagebrush: focus on the plant's smell, small leaves, and tough texture. Have students rub leaves to get the smell of the plant.

Rose: focus on the rose's thorns and brightly colored flowers.

Hawk: draw focus to the bird's sharp beak and claws, and the bird's coloring/patterns.

Adaptation Adventure

Explore the Arboretum and see if you can find the adaptations below. Think about why those are adaptations. Record your observations below!

Wings	Bright Colors	Spikes
Fur	Small Leaves	Tree roots
Pine Needles	Flower	Bird Calls
Large Leaves	Willow Tree	Vines

Animal Communication

Suggested Gardens: Labyrinth garden, lawn in front of the museum, and grassy area between Evan's Creek Bridge and Kleiner Hardwood Grove

Vocabulary: Pheromone, altruism, waggle dance.

Introduction: Animals and plants have special ways of communicating with each another. Today, we will look at how bees, ants, and ground squirrels communicate.

There are three types of bees that live in each colony: queen, worker, and drone. Each has a specific job that helps to support the colony, and communication is essential in helping jobs run smoothly. One way bees communicate is with pheromones. Each type of bee can give off a variety of pheromones to signal an action. Workers will give off a warning pheromone to signal danger and for others to swarm. The queen will give off a pheromone that attracts workers who will bring her food. Another way bees communicate is through movement. Worker bees communicate the location of flowers/food through a movement called the Waggle Dance. The worker bee will perform the dance at a certain angle from the hive to the flower to indicate the flower's location.

Ants live in colonies with one queen, drone male ants, and worker female ants. They communicate with pheromones and physical contact. Ants use pheromones to recruit others to a food source, to mark their territories, and to alarm others to defend the nest. Ants use physical contact to share food with others; this allows other ants to see if the food source is worth finding. When ants are moving nests they use constant physical contact to lead others to the new sites.

Animal Communication

Introduction: Ground squirrels form underground communities made up of multiple generations. They communicate with tail signals, a variety of alarm calls, and the use of pheromones. Ground squirrels are best known for their use of alarm calls. When a predator is near, one squirrel will let out an alarm call to warn others and bring the predator's attention to itself. By sacrificing itself the squirrel ensures its family will survive. This type of behavior is called altruism.

While communication differs among animals, all animals use a variety of their senses to communicate. Even humans use a variety of their senses to communicate.

Activity: Animal Communication Quest

1. Walk around the gardens of the Arboretum and listen for animal calls.
2. Discuss sounds you hear, what animal is making that sound and why.
3. Visit the grassy area near Evan's Creek.
4. With a partner, complete the "Animal Communication Quest".

Thinking Questions:

- 1. Do you think animals have a language like humans?**
- 2. Do you think plants communicate?**
- 3. What are the different types of animal communication?**

Animal Communication

Touch	Sound	Sight	Smell
<p>Guide one another using touch (touching only the hand, arm, or shoulder.) One partner will have their eyes closed and have to be led by the other partner. The partner leading can use all their senses.</p> <p>This method best represents ants.</p>	<p>Lead each other with just the sound of your voices. The partner being led must have their eyes closed and the student calling out directions should be not touch the other partner. No yelling, partners should talk at a normal volume.</p>	<p>Be silent and do not touch each other, only leading each other with body movements. Think about the bee's waggle dance before you begin.</p>	<p>Create a model/ drawing below of how you would communicate using only smell. If you are having trouble, think of pheromones and how certain smells indicate certain actions.</p>

Rain Shadows: Is the Grass Always Greener?

Suggested Gardens: Lear Garden, Santini Grove, the Museum Lawn (west of the Arboretum)

Vocabulary: Leeward, wayward, rain shadow, precipitation.

Introduction: A **rain shadow** is the dry area, or "shadow" created on the leeward side of a mountain range. In Reno, we live in a rain shadow meaning that we receive much less precipitation, rain and snow, than areas on the other side of these mountains.

Rain shadows are found throughout the world. Several others in the United States include: the Rocky Mountains in Colorado, the Cascade Range in eastern Washington, and Death Valley in southern California (it's in a rain shadow cast by the Sierra Nevada just like Reno).

Using maps we can make guesses where we think rain shadows exist by using our understanding of how rain shadows are connected with mountain ranges. However, we can also use maps to find watersheds. We can assume the California side of the Sierra Nevada will have a larger watershed and more water features than the Nevada side; if California receives more water their watershed will be larger.

Activity: Rain Shadow Maps

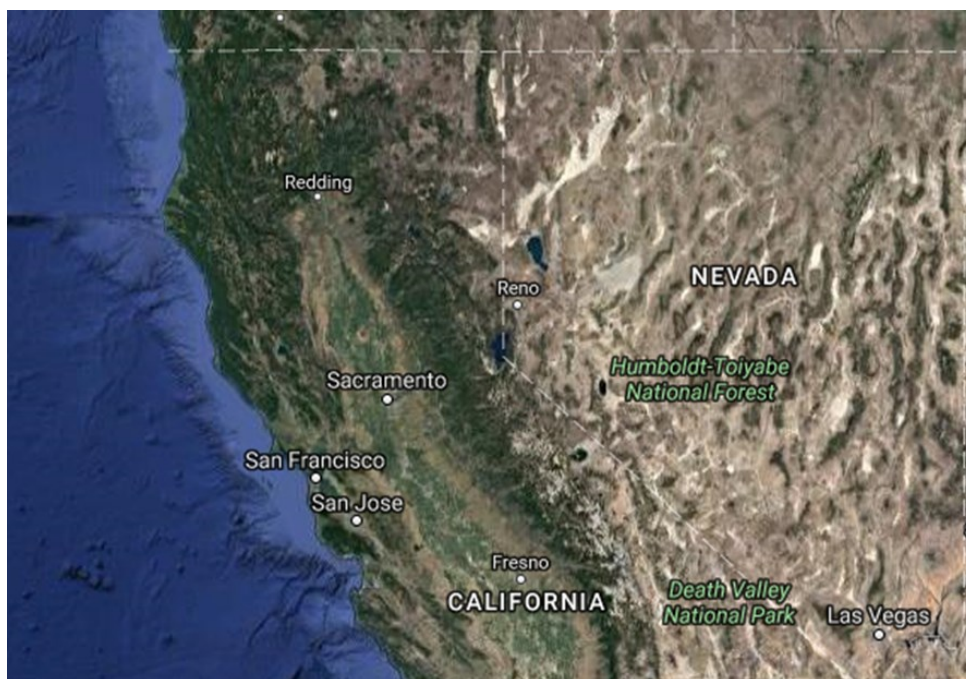
1. Turn to the page titled "Rain Shadow Maps" follow the directions.
2. Draw your ideas on how you think water gets to the Arboretum on the page titled "Rain Shadows".

Thinking Questions:

1. How does water get to Reno? Where does it come from?

Rain Shadow Maps

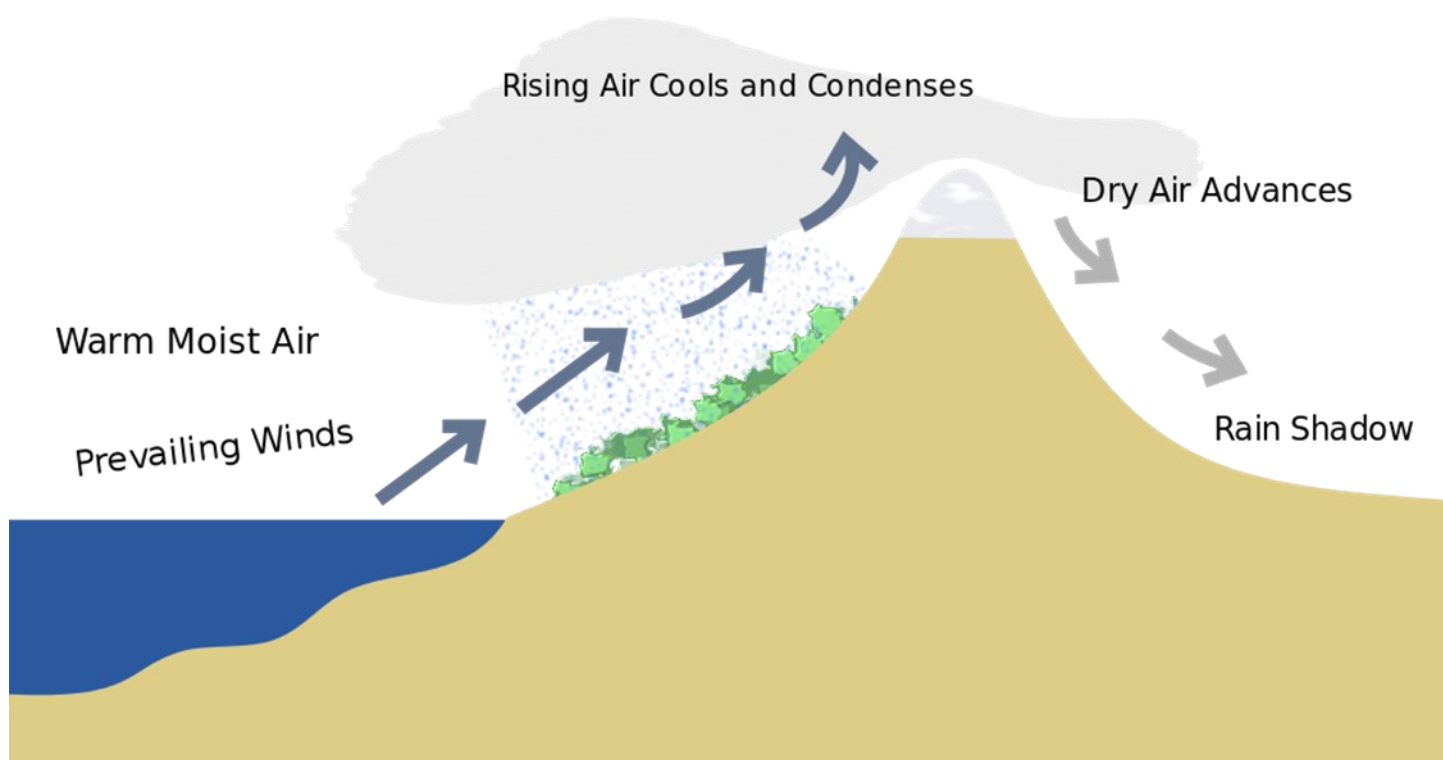
Below is a map of California and Nevada. What is a difference you notice about the states? Why do you think this is?



Below is a closer map of Reno. What do you notice on this map?



Rain Shadow



How do you think water gets to the Arboretum? Draw your ideas below.

Next Generation Science Standards

Fourth Grade

4-LS1-1	Molecules to Organisms: Structures and Processes. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
4-ESS2-2	Earth's Systems. Analyze and interpret data from maps to describe patterns of Earth's features.
4-ESS3-2	Earth and Human Activity: Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

Acknowledgements

- Wilbur D. May Arboretum & Botanical Garden
- Backpacks made possible by generous donations from REI Outfitters
- Amanda Royal, AmeriCorps Arboretum Educator
- Bill Carlos, Horticulturist
- Susan Lester, Volunteer
- Kass Kirkham, Volunteer
- Bev Treadway, Volunteer
- Martha Stewart, Volunteer
- Danielle Ornelas, AmeriCorps Arboretum Educator
- Washoe County School District

